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# Scientific and Philosophical Expertise: An Evaluation of the Arguments on "Personhood"

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by

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## I. Introduction:*

*Because of the interdisciplinary nature of the discussion, I have made use of emphases throughout this paper.

All too often, lately we hear or read the lament, "We just don't or can't know what a human being or a human person really is", or, "There just is no concensus or agreement on what the definition of a "human being" or a "human person" is, so why should one person's or one group's definition be preferred over any other? The definition of a "human being" or of a "human person" cannot be objectively determined, and so must remain a *relative* one."

The aim of this paper is to debunk these current myths concerning the relativism of what a human being or a human person is, and to at least raise the question at the end of how these "myths" came about even at the level of scientific and philosophical professional expertise. What I will argue is that we can and do have an objective and empirically-based definition of a "human being" or "human person", and that other than *conceptually* one cannot really split a human being from a human person. "Personhood" begins when the human being begins.

Toward this end I will address some of the kinds of major scientific and philosophical arguments used to support the sudden appearance of "personhood" at different biological "marker events", indicating that such arguments are grounded on scientific data which is incorrect or misapplied; and that the philosophical claims of these arguments are grounded in systems of philosophy which are themselves very problematic, as any historian of philosophy well knows,[1] with highly indefensible definitions of a "human being" or of a "human person". Such definitions are actually remnants of those

philosophical systems in which conceptual mind/body splits are still sustained, even today. It is important to understand that the question of "personhood" is not simply restricted to some wild-eyed academic's preferred theoretical ramblings, but that the issue has now been translated into the quite practical question of whether or not these "tiny" human beings are as *protected* ethically, socially and legally as are more "mature" human beings — or "persons". The really "burning" question is: if the early human embryo is a human being, is it also a human *person?*

## II. General scientific and philosophical background of the issues

Before addressing the specifics of the science and philosophy, some general charts are provided for an over-all view of the issues. Only a few of the major marker events will be covered, as the actual list is quite long. I refer you, however, to my own analysis of 26 arguments which goes into much greater detail.

Fig. 1 (p. 39) indicates some of the suggested biological marker events during embryological development — from just before fertilization to about 14-days.[2] During this period the major philosophical issues include if the early human embryo is an individual (a prerequisite for personhood), and/or if he/she actually possesses the genetic or formal capacity of a human being or human person. It is during this period also when mass-confusion reigns on the philosophical mis-use of the terms "possibility", "probability", "potentiality" and "potency." These positions are generally arguing for either the actual *capacity* for, or the actual *exercising* of either "rational attributes" or sentience.

Daly[3] represents the type of argument which claims that "personhood" begins at the time when the sperm has penetrated the ovum. Examples of positions arguing for "fertilization" are my own, or Ashley and O'Rourke[4] (although within the advocates of "fertilization", much ambiguity exists as to which point during the process of fertilization itself "personhood" begins). Suarez[5] will argue for the 2-cell stage. And a great deal of the current literature consists of arguments for the 14-day stage.[6] In these latter arguments a general distinction can be made between those which contain elements concerning the pre-condition for the exercising of so-called "rational attributes" — e.g., self-awareness, self-consciousness, interaction with the environment, etc. — and those concerning the pre-condition for sentience, or the ability to feel pain. For those unfamiliar with philosophy, let me just point out that such distinctions — as well as those that will follow — are grounded in different *philosophical* schools of thought.

Some of the suggested biological marker events range from 14-days and after, as indicated in Fig. 2.[7] During this period the major philosophical issues include: individuality, the biological substrate as the precondition for the capacity for "rational attributes", or for sentience — or for the actual *exercising* of those capacities. The full *integration* of those substrates and capacities are also at issue.

As noted, writers such as Bole[8] argue that individuality and ensoulment are not possible until after 2-6 weeks, whereas Singer and Wells[9] argue that only after 6 weeks is sentience possible. At 8 weeks Lockwood[10] argues for the beginning of "personal identity", and Shea[11] for that point where the brain actually controls

bodily functions as a whole. Finally, there are those who focus not on the mere capacity but the actual integration and exercising of "rational attributes" and/or sentience as a condition for true personhood, such as Hare[12] or Englehardt[13] (or Singer[14]).

As these and similar distinctions made between a human being and a human person are really *philosophical* distinctions, I have sketched the major historical philosophical sources of a mind/body split in Fig. 3 (although one could go back to Plato and beyond).[15] The major point I want to indicate is that some philosophical schools of thought define a human being as *one whole* substance, and thus there is no mind/body split inherent in their theories. Such theories define a human being in terms of the *actual nature* of the human substance. Characteristics such as "rational attributes", sentience, moral autonomy, etc., are only *activities* of powers which are of secondary consideration, because they are consequent to or *follow upon* the actual *nature* of that substance.[16] Other "schools" do maintain a mind/body split inherent in their theories; a human being is defined as two independent and separate substances. Interestingly, most of the theories addressed here are derivative of these modern philosophies, especially that of Descartes.[17]

An entire paper — or even a book — could be dedicated to explaining the theoretical and practical *consequences* of such mind/body splits, especially in the present context. Suffice it to point out that where there is such a split — where the mind (or even the whole "soul") is an independent substance in and of itself, separate or apart from the "body" — which is seen as an independent and separate substance in and of itself — then it is impossible either *theoretically* or *biologically* to "piece them back together again", as Humpty Dumpty might have said! Nor could one explain any *interaction* between these separate "substances". We can see the effect of such Cartesian dualism — and the consequent historical breaking-off to either *rationalism* or *empiricism* in the distinctions writers make here between a human being and a human person.

## III. Biological marker events of personhood

There are enumerable points along the continuum of embryological development at which different writers claim the appearance of so-called "personhood." These are claimed as "biological marker events of personhood" — before which there is only a human being (at best); and after which there is a human person. Before that biological point, then, the human embryo or human fetus is considered as only an "object", a "thing" which may be used or dealt with according to the personal objectives or desires of another human being — who *is* a human person. After that particular biological marker event we suddenly have a human person, who is now considered a "subject" or an entity deserving of protections against the objectives or desires of another human person.

### *A. Syngamy as the beginning of personhood*

In order to identify the major issue quickly, a few questions might be posed so as to clarify at the start exactly what is at stake when we *define* a human being

or a human person in one way or another. If our definition is incorrect — even in part — then the *consequences* of this incorrect definition are long-ranged and potentially profound. Aristotle reminds us of something we all know too well. To paraphrase him: A small error in the beginning leads to a multitude of errors in the end.[18] In this case, if one's definition of a human person is incorrect, then one might find one's self experimenting on something which one thought was not a human being or a human person — but which in fact really is.

So I pose the question — how would you yourself define a human person? Would you consider any of the following a human person: a rock; a head of cabbage; a giraffe; . . . those who are old and senile in a nursing home; Alzheimers patients; Parkinsonian patients; stroke victims; comatose patients; drunks and alcoholics; drug addicts; the homeless, poor; prisoners; the emotionally ill and depressed; mothers-in-law; teen-agers; the physically handicapped; the mentally ill; children under 7 years of age; a new-born baby; the fetus before the mother has given birth (or, at 6 months, 8 weeks, 35 days, 14 days, 6 days, 2 days, fertilization, or the egg or the sperm). These latter examples actually constitute some of the different biological markers at which various writers claim that there is present a human person. Obviously there is some disagreement about exactly when we have, definitionally, a human person present. And that period of time between fertilization and 14 days is the grayest area, i.e., the seemingly most difficult and most controversial stage.

What, then *is* a human being or person — and when does he or she begin? I will argue that at the biological marker or moment of *syngamy* — i.e., the last crossing-over of the maternal and paternal chromosomes at the end of fertilization, *substantial* change (or a change in *natures)* has taken place — and a new, unique, living, individual human *person* is present. I will also argue that from syngamy onward — including the zero to 14-day old human embryo stage — until the death of the adult organism — *accidental* change (or a change only in *accidents)* has taken place, in which a human person is continuously present.[19]

*1. The connection between science and philosophy*

First, although a question about "natures" seems to be fundamentally a *philosophical* one, I would argue that any philosophical reflections, analyses or accounts about the nature of a human being or person must begin or *start* with the empirically observable *biological* facts.[20] Otherwise our philosophical concepts actually bear little or no relation or resemblance to the real world which we are trying to understand and explain by those concepts. Instead, I would suggest, we are left with multiple half-truths or fantasies — or wishful thinking! Epistemologically, the starting point of our philosophical questions and investigations about reality must be grounded in that empirical and scientific reality. Only in this way can we have a realistic or objectively-based definition of a human being — one that is not relativistic.

The question requires that we start with the biological facts that we do know about human beings and human persons. It is critical to understand how very important it is to use the correct biological facts in any considerations of a

definition of a human person — as well as to consider exactly when during embryological development we can claim there is a human person present.

Operationally, what is the connection between a thing's nature and the biological facts? Put briefly, the answer is that we can know *what* a thing is by observing its *actions* or functions — how it behaves, what it does. We know that a thing acts according to the kind of thing it is, i.e., its nature. That is simply an empirically observable fact. In first-year chemistry or in microbiology students are given "unknowns" which they must identify by means of the kinds of actions or reactions exhibited by these "unknowns." Indeed, this is the obvious principle behind any basic or experimental research. The research biologist first observes the actions, reactions, functions of a biological entity and reasons from these *specific* kinds of actions back to the *specific* kind of nature it possesses. It is this nature which directs and causes such characteristic actions. As biology texts themselves discuss it: function follows form.[21] Thus Na burns orange, and cobalt burns blue/green — or betahemolytic streptococcus can only be grown on specific culture medium containing blood, but not on other mediums. Further, a thing is not only characterized by its nature which determines the specific kinds of actions it *can* do — but the same nature *limits* the kinds of actions it can do. That is, there are certain actions which a thing can not do because it does not have the specific kind of nature it would need to do it. For example, birds have wings and so can fly — but stones, dogs or human beings can't fly; corn stalks produce ears of corn and corn proteins and corn enzymes — but acorns, tomato plants or asteroids do not and cannot produce corn or corn proteins. Frog embryos direct the formation of frog tissues and organs — but they cannot direct the formation of *human* tissues and organs.

Apply these considerations to the point at hand. To determine what a human being or person is is really not all so difficult as is often claimed. We are not Gods or angels — but *embodied* human beings.[22] We do have bodies — don't we? At least I have never seen a simple "soul" wandering aimlessly around the labs, or manipulating an electron microcsope — or a stethoscope — without a body. In fact, I have never seen even a Platonic or a Cartesian philosopher *"thinking"* without his or her body! As Aristotle noted, the whole man thinks; the whole man knows; and the whole man acts.[23] There are voluminous biological facts which we do know already about the human body and its embryological development. Clearly by observing and studying these known biological facts — how the human being begins his or her biological existence as a specifically *human* zygote, and the kinds of specifically *human* functions and *human* actions that take place during embryological development — we can then determine to a very sophisticated extent the *nature* of a human being or a human embryo — or *what* it is. So I will turn now to a brief consideration of the biological facts about which most if not all of us are already aware.

### *2. The scientific facts*

Before fertilization there exist a human sperm (containing 23 chromosomes) and a human ovum or egg (also containing 23 chromosomes — the same number,

but different kinds of chromosomes).[24] Neither the sperm nor the egg, singly, by itself, can become a human being — even if implanted in the womb of the mother. They are only *gametes* — they are not human embryos or human beings. In contrast, the single-cell human zygote formed after fertilization, or syngamy, contains 46 chromosomes (the number of chromosomes which is specific for members of the human species) — and these 46 chromosomes are mixed differently from the 46 chromosomes as found in the mother or in the father —that is, they are unique for that human individual. If allowed to "do his or her own thing", so to speak, this human zygote will biologically develop continuously without any biological interruptions, or gaps, throughout the embryonic, fetal, neo-natal, childhood and adulthood stages — until the death of the organism. And with the advent of *in vitro* fertilization techniques, we can see that the early human embryo can develop *in vitro* on his or her own without the nutrition or protection of the mother for quite a while — someday, perhaps, even until "birth!"

In response to Daly, who argues that personhood begins at penetration (before syngamy), I want to reiterate that a human gamete is not a human being or a human person. The number of chromosomes is only 23; it only acts or functions biologically as an egg or as a sperm, e.g., it only makes egg or sperm enzymes and proteins, etc., not specifically *human* enzymes and proteins; and *by itself* it does *not* have the *actual capacity* or potency yet to develop into a human embryo, fetus, child, or adult, even if already enveloped by a single membrane, as at penetration, *before* the chromosomes have combined. And in that sense gametes are only *possible* human beings (i.e., non-existent human beings). Only *after* the sperm and the egg chromosomes *combine* properly and completely do we have a human being. Individually, the nature of a sperm is different from the nature of an egg — and both are different from the nature of the human zygote which is formed when their chromosomes combine.

Thus from perhaps an Aristotle-the-biologist's point of view, one would say that before fertilization there are two natures — i.e., the nature of an egg and the nature of a sperm. After fertilization there is a human zygote with *one* nature, i.e., the nature of a human being. Again, in fertilization there is substantial change,[25] i.e., a change in substance or nature. The substances or natures of the egg and the sperm have changed into the nature of a human being. This is known empirically by observing the number and kinds of chromosomes present before and after fertilization, and by observing the *different* characteristically specific actions and functions of the egg, the sperm, and the human zygote. After fertilization there is not substantial change, but only accidental change.[26] That is, the nature of the human being does not change, only its accidents change. Thus embryological development does not entail substantial change, but only accidental change. Once it is a human being it stays a human being, and acts and *functions biologically* as a human being. The human zygote produces sepcifically *human* enzymes and proteins; he or she forms specifically *human* tissues and organ systems, and develops *humanly* continuously from the stage of a human single-cell zygote to the stage of a human adult.[27]

This is observed empirically. A human zygote does not produce cabbage or

carrot enzymes or proteins, and does not develop into a rock, an ear of corn, nor into a cat, a horse, a chicken, or a giraffe. Empirically it is observed that a human zygote produces specifically and characteristically *human* proteins and enzymes at the moment of syngamy — as demonstrated recently, for example, by experiments using transgenic mice[28] — and that he or she develops continuously throughout embryological development in a specifically and characteristically *human* way.

In short — the biological facts demonstrate that at syngamy we have a truly *human* nature. It is not that he or she will become a human being — he or she already *is* a human being. We know that empirically. And this nature or capacity to act in a certain characteristic way is called, philosophically, a nature or a *potency.*[29] Thus a human zygote or embryo is not a *possible* human being;[30] nor is he or she *potentially* a human being;[31] he or she *is* a human being. A human zygote, embryo or fetus does not have the potency to *become* a human being, but already possesses the potency or capacity to *be* at that moment a human being. And that potency will direct the accidental development, i.e., the embryological development, of his or her own self from the most immature stage of a human being to the most mature stage of a human being.

Now, this is strongly convincing empirical evidence that at syngamy there is a human being; but is there also a human person — or not? It is in this shifting from the paradigm of a human being to that of a human person where the philosophy comes into play again. Is a human being also a human person; or are they different things? Which philosophy is adequate to cope with this biological data?

### *3. The matching philosophical concepts*

(Fig. 3) With even only a cursory rummaging through the history of philosophy, there is one major "realistic" philosophical "ball-park" which would deny an essential distinction between a human being and a human person — they cannot be split or separated from each other — except perhaps only *conceptually.* This philosophy was part of a 2500 year old tradition which was the bath water, so to speak, that was thrown out with the baby! It is the philosophical ball-park, for example, of Aristotle-the-biologist.[32] For Aristotle — as well as for others, such as Thomas Aquinas — his major metaphysical and anthropological treatises argue consistently for a human substance with no mind/body split (although there is evidence of a serious Platonic streak in his *De Anima* — that atypical and historically problematic treatise of Aristotle's so often quoted by contemporary scholars — as well as historians who researched for *Roe v Wade).* As Aristotle argues, "...'nature' has two senses — matter and form. If one considers 'nature' as the form, then it would be the shape or form *(not separate except in statement)* of things which have in themselves a source of motion"[33] (emphasis added). Again, he says, "...the physicist is concerned only with things whose forms are separable [in the mind], indeed, but do not *exist* apart from matter."[34] And similarly, matter cannot exist apart from the form. For Aristotle, the human being is defined as *one* composite substance — the vegetative, sensitive and rational powers of the "soul" together with the human "body."[35] The whole soul, he wrote, is

homogenous, and in each part of the body as *one* whole composite:

> *In each of the bodily parts* there are present *all* the parts of the soul, and the souls so present are *homogenous with one another and with the whole;* this means that the several parts of the soul are *indisseverable from one another.*[36] (emphasis added)

And in contrast to his opposite view in the very same *De Anima* (which contradicts the above passage), Aristotle addresses the very possibility of a "being-on-the-way", or an "intermediate" human being, railing against the anthropological consequences of Plato's or Pythagoras' mind/body split when he very sarcastically retorts: "Yet how are we to *believe* in such things?"[37] Although Aristotle-proper did not actually use the term "person", he clearly would have to concur that a human being *is* always a human person, for neither form nor matter can exist on their own as two different *things* or independent substances.

Thomas Aquinas, to give another example, puts an even finer gloss on Aristotle's anthropology, by affirming his own adamant rejection of Plato's anthropology. To paraphrase Thomas: the name of "person" (and he uses that term) does not belong to the rational part of the soul, nor to the whole soul alone — but to the entire human substance (or, *subsistens).*[38] This means that the whole soul, whole body and its act of existing constitute *one* substance entire — with no separate and troublesome independent "parts" which are claimed to be true and independent substances. And it is worth noting that Aquinas is one of the only philosophers who includes undesignated *matter* in his formal definitions of natural things — of which man is one.[39]

For Thomas, a human being is a human person, and the later characteristics which we will look at in these debates, such as "rational attributes", autonomous willing or sentience, are only consequential and secondary or accidental actions which follow upon certain powers (not "parts") which themselves follow upon the essential nature of the human being itself.[40] That nature is defined as the single, whole, formal, material and existential human substance. As Thomas states:

> ...*the soul must be in the whole body* [and therefore not just in the brain], and in each part thereof . . . for to the nature of the species belongs what the definition signifies; and in natural things, the *definition* does not signify the form only, but the form *and* the matter . . . so it belongs to the notion of man to be composed of soul, flesh and bones.[41] (emphasis added)

These philosophical precisions force at least two major questions on any of the several types of Aristotelean/Thomistic frameworks. First, if it is claimed that the "rational" soul — which "organizes and directs embryological development" —is not infused until sometime up to about the third month,[42] then what explains the specifically *human* organization of the human embryo and human fetus up to that point? Hasn't the work of this supposed "delayed rational soul" already been done — as empirically verified? If so, then this biological evidence of specifically human organization which we do empirically observe must be accounted for by the presence of the *human* soul right from the beginning. In addition to the specifically human structural organization from the beginning, we also empirically observe specifically human functions and activities from the

beginning — e.g., the production of specifically human proteins, enzymes, etc. If so, then this biological evidence of specifically human functions and activities which we do empirically observe must be accounted for by the presence of the *human* soul right from the beginning.

Second, for both Aristotle and Thomas the "rational soul," or more properly, power, *includes virtually* the vegetative and sensitive powers,[43] and for neither is there such a thing as a "rational soul" alone, or even a whole soul alone — or a whole soul without a body (except in some sections of the *De Anima).* The whole human complex (body and soul) must be present together at once. Apart from the biological and conceptual absurdity of an "intermediate man", if there were only a "human vegetative" soul present at first, how do we explain the production of specifically *human* enzymes and proteins — instead of carrot or corn enzymes — from the very start? If there were only a "human vegetative and sensitive" soul present, how do we explain the production of specifically *human* tissue and organs — instead of only giraffe or gorilla organs and systems? If the human soul cannot be split (and must contain all three powers at once), and if specifically human enzymes, proteins, tissues, organs and structures are empirically observed — which they are — then the human *rational* soul *must* be present at the very beginning along with the human vegetative and sensitive "powers" (not "parts") of the human soul. And this "soul" — or, more properly, these powers — must exist as a composite with the human body which it is organizing and whose functions and activities it is directing. Thus, at syngamy, I would argue, the "matter" is *already appropriately organized as human* — since we empirically observe it as *human* and as developing *humanly.*[44]

So far the scientific facts and the philosophical concepts match. At this point I want to take a closer look at the biological facts *after* fertilization, i.e., those of human embryological *development.* Along the way I will point out several other different biological "marker events"of personhood which have been variously argued by others. All of these writers will make a distinction between a human being and a human person — supposedly based on these biological marker events. The use of certain biological data which they will use to support their arguments will also be addressed.

### *B. Zero - 14-days*

As noted above, the newly formed single-cell human zygote consists of 46 chromosomes *and* non-nuclear DNA in which are coded the specific directions for virtually *all* of the processes of embryological development. The content of this initial pool of genetic information never changes throughout embryological development. Yet it has been argued by Bedate, Cefalo[45] and Bole[46], for example (Fig. 1), that *not* all of the information needed is present in this single original cell, that some of the information comes from "positional molecules" in later stages of development, and some even comes from the molecules originating from the mother. They conclude that the original zygote does *not* contain *all* of the information needed to be a self-directing, human individual, and therefore it is *not* a human person.

I would question this biological data. First, "molecular information" or "positional information" *itself* is coded in the original single-cell human zygote. As the well-known embryologist Moore discusses at great length, the genetic information in the original human zygote *determines* what molecules will be formed, which in turn *determine* what proteins and enzymes will be formed, which *determine* which tissues and organs will be formed. In genetics this is called the "cascading effect."[47] That is, the information in the original single-cell human zygote "cascades" throughout embryological development — each previous direction causing the specific formation of each succeeding direction. Thus, *all* "positional" or "molecular" information or direction is already determined itself by the information which preceeded it, and ultimately by the original information in the single-cell human zygote.[48] Second, although the information in the human zygote may direct the absorption of molecules *from* the mother —that hardly means that the maternal molecules or the mother herself determines the very *nature* of the growing embryo or fetus which she is nurturing. (This argument is also rejected by Suarez[49]). The nature of the embryo or fetus, as is known, is determined by the formal biological genetic make-up of the *zygote* from which he or she continuously develops — and the *directing* of this absorption of maternal molecules is done by the genetic information within the embryo or fetus — not by the mother or any genetic or "molecular" information from the mother. Those are simply the correct biological facts. As Jerome Lejeune, the Nobel-prize winning geneticist has testified:

> . . . each of us has a unique beginning, the moment of conception . . . As soon as the twenty-three chromosomes carried by the sperm encounter the twenty-three chromosomes carried by the ovum, the *whole information* necessary and sufficient to spell out all the characteristics of the new being is gathered . . . (W)hen this information carried by the sperm and by the ovum has encountered each other, then *a new human being is defined* which has never occurred before and will never occur again . . . [the zygote, and the cells produced in the succeeding divisions] is not just simply a non-descript cell, or a "population" or loose "collection" of cells, but a very specialized individual, i.e., someone who will *build himself according to his own rule.'*[50] (emphasis added)

Next, it is argued by some that this original single cell divides neatly first into 2 cells, then into 4 cells, then into 8 cells, etc.[51] This biological data too is questionable, (and has consequences in understanding the argument about "totipotency"). As known and published in embryological textbooks for over 60 years (as Lejeune[52] points out), the original single cell divides into 2 cells — and then only one of those cells divides, giving 3 cells. After a time the other cell divides, making it 4 cells, and then 8 cells, etc.

Part of what happens at this *three-cell stage* is that one can observe empirically the process of *methylation.* This observation is important philosophically. Many argue that these very early cells — including the original single-cell zygote up to the 8-cell stage — are "totipotent."[53] They *explain* totipotent cells as the most vaguely directed and least differentiated cells in all of embryological development. Each cell is not yet *determined* enough to be classified as an individual human being or a part of an individual human being. These cells,

they say, have not yet "made up their minds" what they want to be. They can become any number of things. These cells are not differentiated or specialized enough yet. What happens in early development, they claim, is that there is a gradual change from total unspecialization to greater and greater specialization or differentiation. For example, at first we have a cell that could become any kind of human cell. Progressively a cell becomes specialized so that it can only become a kidney cell, or a stomach cell, or a muscle cell, i.e., it becomes more and more determined and differentiated.

This portrayal of differentiation is backwards, as Lejeune notes. The original single-cell human zygote is the *most determined* and specialized cell in all of development. Progressively he or she looses, in fact, the ability to *use* information. A kidney cell, for example, contains virtually *all* of the information that was in the original single human zygote cell. The human zygote has not lost any of this information — only the ability to *use* this information. This ability to use or not use the information that is present is partially determined by the process of methylation (which is *coded* in the original single-cell zygote). Through methylation and other processes during embryogenesis, genes are turned on or turned off. When the cell wants to control the use of cellular information, it methylates a molecule to silence that gene, to block or stop its use at a certain point in development. No information is progressively lost; only its *use* is lost. Thus a specialized kidney cell cannot be prodded to become an entirely new human being — not because it does not have all of the necessary information (it does), but because all of the information other than that of being a "kidney cell" has been methylated, or silenced.[54]

Thus to be so differentiated as a kidney cell is actually a negative in such arguments. The kidney cell cannot direct anything but a small miniscule part of the development of the human embryo or fetus; whereas the original single-cell human zygote contains and can use *all* of the information only partially used by the later cells. Thus there is nothing vague, undirected or undecided about it. It is the *human zygote* which represents the greatest fullness of human content and useable information, of directedness and decisive action — more than that found in any of the later cells. The human zygote will decide what reactions and formations take place. He or she will direct *all* of the processes and formations during the *entire* embryological process.[55] "Totipotency" is even *supposed* to happen — it is a *normal* part of human embryogenesis, and is indeed encoded in the original genetic information of the human zygote. Differentiation is *also* encoded in the original human zygote, and is partly explained by methylation. Differentiation, then, really represents the *restricted* ability to make any "decisions".

Next, Suarez argues for the 2-cell stage, with, as he claims, the *completion* of the first division and of the genetic input. "The two-cell stage already is, like the adult, a moment in the execution of the program 'man'." And besides, he argues, the two-cell stage is already the *same* living being as the human adult arising from it.[56] However, we already know that the genetic input is complete at the *zygote* stage, and that the zygote in fact is the source of the genetic input of the two-cell stage. We also know that the zygote, too, is the same living being as both the

two-cell stage and the adult stage. Thus Suarez's own argument actually argues for the zygote rather than for his two-cell stage.

But to continue, the cells will proceed to divide until about 5 or 6 days, when two cell layers are formed — the trophoblast or outer cell layer, and the blastocyst or inner cell layer. Some writers, such as Grobstein and McCormick, have stated that this stage is significant because they can demonstrate empirically that there can be no true human *individual* present at this time — we have only a genetic individual, not a developmental individual. A person can be present, they claim, only if there is a developmental individual — and this cannot take place until 14-days:

> I contend in this paper that the moral status — and specifically the controversial issue of personhood — is related to the attainment of developmental individuality (being the source of one individual)[57] . . . It should be noted that at the zygote stage the genetic individual is not yet developmentally single — a source of only one individual. As we will see, that does not occur until a single body axis has begun to form, near the end of the second week post fertilization when implantation is underway.[58]

These early cells, they claim, are only "collections" of undifferentiated, "totipotent" cells, and they name them, or designate them collectively, as only comprising a "pre-embryo" (a term, by the way, which is *not* used by embryologists — only philosophers, theologians and bioethicists. And it is a term which was rejected by the judge in the *Davis v Davis* frozen embryo case).

The scientific facts which they give to support these claims are the following. They claim that *only* the cells from the inner layer, the blastocyst, eventually become the adult human being. The cells from the trophoblast layer, they write, are *all discarded* after birth as the sac and the umbilical cord, etc. Thus, *developmentally,* the implication is, that we are not dealing only with those important cells which will become the adult human being, i.e., the blastocyst, but rather a mixture of "essential" and "non-essential" cells, i.e., a PRE-embryo. A pre-embryo, then, is not even a human being, much less a human person, yet:

> This multicellular entity, called a blastocyst, has an outer cellular wall, a central fluid-filled cavity and a small gathering of cells at one end known as the inner cell mass. Developmental studies show that the cells of the outer wall become the trophoblast (feeding layer) and are precursors to the later placenta. *Ultimately, all these cells are discarded at birth.*[59]

But, again, these scientific "facts" are questionable, and necessarily lead to questionable *philosophical* concepts. It simply is not true that *all* of the cells from the trophoblast layer are discarded after birth. As can be found in virtually all embryology texts, including Moore's text from which they quote, many of the cells from this trophoblast layer become an *integral* and *essential* part of the constitution of the *fetus, newborn and adult human being.* For example, the cells from the trophoblast layer known as the yolk sac cells become part of the adult gut. And cells known as the allantois cells become part of the adult ligaments, blood cells and urinary bladder.[60]

Thus these "scientific" facts used by Grobstein and McCormick are, scientifically, highly problematic — and therefore so also are their philosophical

conclusions about "preembryos" and "developmental individuals" which are grounded on those highly problematic scientific facts.

But the same writers continue. It is impossible, they claim, for a human person to be present until at least the 14-day marker event, at which point the primitive streak forms in the embryo. The philosophical significance of this marker, it is claimed, is that until the formation of the primitive streak it is possible for *twinning* to take place. The totipotent cells "do not yet know whether to be one or two individuals." After 14-days, they claim, *twinning is not possible,* and thus the organism is finally determinantly one individual — an essential pre-requisite for personhood.[61]

But, again, this science is problematic. As Karen Dawson[62] points out in these debates — and as is found in every human genetics textbook — it *is* possible for monozygotic twinning to take place after 14 days and the formation of the primitive streak. For example, fetus-in-fetu twins can be formed up to 2 and 3 months *after* fertilization, and Siamese twins even later. Also, it is known that "twinning" is sometimes *genetically determined and coded* in the original human single-cell zygote (as, indeed, is totipotency and differentiation). There is nothing magical, it turns out, about this 14-day stage as far as the concept of individuality and personhood is concerned. If a 2-cell, 8-cell, implantation stage, 14-day primitive steak stage embryo or 4 month fetus splits into twins, that simply means that the original entity was one individual — and now there are simply two individuals. The fact of twinning says nothing about the individuality of the first individual. Indeed, the history of all living organisms is of one individual giving rise to another individual — but one would certainly not then conclude that there were therefore no individuals ever present, or that the former individual was hopelessly "undecided."

Ford[63] also argues for the 14-day stage, based primarily on the same science from Grobstein, although Ford claims there is an individual present at fertilization — but it is only a biological individual. Rational ensoulment cannot take place until after 14 days, at which point there is, he claims, an ontological individual, i.e., when *differentiation is completed* and there is a distinct individuality.[64] But aside from the problems with the science of Grobstein and McCormick, complete differentiation does not actually take place until well *after birth.* As the embryologist Moore states:

> Human development is a continuous process that begins when an ovum from a female is fertilized by a sperm from a male. *Growth and differentiation* transform the zygote, a single cell formed by the union of the ovum and the sperm, into a multicellular adult human being. Most developmental changes occur during the embryonic and the fetal periods, but important changes also occur during the other periods of development: childhood, adolescence, and adulthood . . . Although it is customary to divide development into prenatal and postnatal periods, it is important to realize that birth is merely a dramatic event during development resulting in a distinct change in environment. Development does not stop at birth: important developmental changes, in addition to growth, occur after birth . . . Most developmental changes are completed by the age of 25.[65]

Certainly a 14-day embryo is definitely *not* completely differentiated.

*C. After 14-days*

Sometimes Wallace,[66] too, wants to argue for 14-days, but he is inconsistent and seems more to argue for a point after 14-days. He bases his own position on what he calls an "Aristotelean-Thomistic" theory of "natural law." This "natural law theory" grounds his distinction between *transient* natures (or seeds, or beings-on-the-way) as applied dubiously and analogously to the transition from plant, animal, to human nature during *human* embryological development; and *stable* natures, as applied to the actual embryological development of individual systems of plants, animals and human beings. This "transition" from plant, animal to human substances during *human* embryological development for Wallace is, then, actually a series of *substantial* changes within human embryogenesis itself; and once again he bases much of his argument on the science of Grobstein and McCormick, and a rather scholastic rendition of Aristotle and Aquinas, as well as a distinctively physicist's rendition of "science".

Two points out of many which are problematic are his descriptions of his "Aristotelean-Thomistic" grounding, and the blatant contradiction in his analogy. First, Wallace subscribes to the Aristotle of the *De Anima,* and attributes to both Aristotle and Thomas a theory of the "eduction" of these substantial forms from "proto-matter", substantial forms which Aristotle, he says, would call "natures", and which Thomas, he says, would define as (quantity + proto-matter) — a definition of substance with which neither Aristotle-proper nor Thomas would agree. Wallace renames this as "mass-energy", to bring Aristotle and Thomas up to date with modern physics![67] However, Wallace is really elucidating a very scholastic interpretation of both Aristotle and Thomas, one with which neither the historic Aristotle nor Thomas can be reconciled. Neither of them gave any real existence to "proto-matter", or what I think Wallace confuses with "prime matter". And, indeed, for both of them "prime matter" was only a conceptual construct, and by definition, was totally *without forms*[68] — indeed, that was the whole point! As Klubertanz states:

> Of itself, prime matter is *not actually any kind of thing;* nor does it have quantity, or any kind of qualities or other accidents. Hence prime matter *cannot exist in itself;* it cannot be found as such in direct or indirect sense experience; it cannot even be understood separately from substance or substantial form. It is an *intelligible* co-principle . . . .[69]

Thus no substantial forms *can* be educed from "proto-matter" for either Aristotle or Thomas, because there were *no forms* there to begin with. And Thomas, like Aristotle, actually argued against this sort of theory:

> Creation does not mean the building up of a composite thing from pre-existing principles; but it means that the *composite* is created so that it is brought into being *at the same time with all its principles* . . . creation is the production of the *whole being* and not only of matter.[70]

Further, "quantity" for both Aristotle and Thomas was an *accident* of substance, not a substance itself.[71] Thus neither would even equate *their* "quantity" with the modern concept of "mass." Wallace also never includes *esse* (the act of existing) — which is the *hallmark* of Thomas' definition of any substance — in any of the

definitions of "substance" which he attributes to Thomas. He simply never mentions *esse* at all.

Second, his concept of "transient natures" is drawn from rather shakey chemistry and biology. He claims, for example, that when Na and Cl react together they each actually change their *natures.* But Na and Cl are only sharing electrons, not *protons* (which determine the *kind* of element it is, and which place the element in a specific place in the periodic chart). He also fails to mark the critical *differences* between the *nucleuses* of radioisotopes and those of living cells. Nor does he mark the critical differences which distinguish the *generation* of a radioisotope from that of a plant; nor that of an animal from that of a human being. He also builds a "model" of what he calls "transient natures", yet admits that they probably are *really* "stable natures"! Inexplicably he will call them "transient natures" anyway![72] He then applies his own theory of *transient* natures, questionable even to himself — to plant and animal generation — all the while acknowledging that real plants and real animals have *stable* natures which are descriptive of the *mature* individuals only — *not* to the developmental stages of those individuals![73] How credible is such a theory?

A final marker event I will point out is 8 weeks or several time-markers after that (Fig. 2). — although there are many others with equally troubling science invoked. Personhood, it is claimed, does not begin until the *dawning* of or the *maturation* of the physical substrate of human consciousness, self-consciousness, or sentience — i.e., the nervous system and/or the brain. Indeed, there is already a movement by some in legal jurisprudence to formalize the legal concept of "brain *birth"* to denote that point in time biologically when there is present a "person", as a *parallel* to the already legal criteria of brain *death.* One criticism of this claim comes from Gareth Jones, who rejects claims that we can determine the biological point of either "rational attributes" or sentience. As he states, the *parallelism* between brain death and brain birth is invalid. Brain death is the gradual or rapid cessation of the functions of a *brain.* Brain birth is the very gradual acquisition of the functions of a developing *neural* system. This developing neural system is *not* a brain. He questions, in fact, the entire assumption and asks what *neurological* reasons there might be for concluding that an incapacity for consciousness *becomes* a capacity for consciousness once this point is passed! Jones continues that the alleged symmetry is not as strong as is sometimes assumed, and that it has *yet* to be provided with a firm biological base![74] A different Jones who is partaking in these debates makes the following poignant remark:

> The reproductive biologist cannot assign moral status to the sperm or the egg or the fertilized egg or any of the subsequent products that may result from this fusion . . . The reproductive biologist can help, however, by assuring that other scientists or those who wish to assert a moral status, and use a biological term or concept to do so, *know what they are talking about!*[75] (emphasis added)

The fact is that complete physiological brain integration is not complete until many months or years *after* birth,[76] just as the complete exercising of "rational attributes" is not possible until years *after* birth.[77]

## VI. Philosophical definitions of "personhood"

I could continue, biologically, down any number of "marker events" where it is argued at different points during biological development that until that point there is only a human being and only after that point there is a human person. But virtually every single marker event claimed is also using extremely problematic scientific "data" to back up their philosophical claims of personhood. It would seem that there is more of a problem here than simply the use of problematic science. Perhaps there is also involved — whether consciously or not — the *imposition* on that science of certain characteristically problematic *philosophical* presuppositions. What I see is the use of specific metaphysical presuppositions which result in a classic mind/body — or even sometimes a body/body split. A rough consideration of just how different philosophical schools of thought have *defined* a "human being" or a "human person", then, is in order. Especially in light of the obvious biological *continuity* present throughout the entire course of embryological development, as well as the specifically *human* development which we know empirically takes place, how adequately do the various philosophical definitions of a human person *reflect* the correct biological facts as we empirically know them?

I will focuse on the definition that is most generally agreed upon these days, i.e., one that is basically "derived" from Descrates[78] or Locke.[79] Generally, a human *person* is someone who is actually *acting at the time* in a *rational* manner (Fig. 3). That is, he or she is self-conscious, self-aware, competent, autonomous, logical, mature, conversant, and interacts with the environment and other rational beings around him or her. In short, if one is *acting rationally* one is a person. If this is true, then 99% of the possible examples of human persons I gave you at the beginning of this paper are — by definition — *not persons!*

This is the sort of philosophical definition that in fact has been used for years by writers such as Englehardt,[80] Tooley,[81] Kuhse[82] and Singer[83] (yes, the animal rights person) who argue in the literature for *infanticide* of even a *normal* healthy infant! If, they argue, a normal new-born baby can not act rationally (as described above), then it is not a subject but only an object — and we can therefore use it in destructive experimental research if we rational agents so chose. In Singer's own words:

> Now it must be admitted that these arguments apply to the newborn baby as much as to the fetus. A week-old baby is *not* a rational and self-conscious being, and there are many non-human animals whose rationality, self-consciousness, awareness, capacity to feel pain (sentience), and so on, exceed that of a human baby a week, a month, or even a year old. If the fetus does not have the same claim to life as a person, it appears that the *newborn baby is of less value* than the life of a pig, a dog, or a chimpanzee.[84] (emphasis added)

Would you agree that the killing of normal healthy human infants is morally justifiable? If not, then we have to *question,* at least, such very *rationalistic* definitions of a human person, and the metaphysical and epistemological foundations on which they are grounded. If one argues from the rationalistic premise that a "human person" is defined *only* in terms of active "reason" (or

only the rational *part* of the soul), and if *only* normal older children or adults exhibit such active "rational attributes", then even a normal newborn infant, or a two-year old child is *not* a person - and you must agree with Singer's or Englehardt's arguments for infanticide.

On the other hand, sometimes a "human person" is defined *only* in terms of the *whole* soul - i.e., the vegetative, sensitive and rational "souls" all together. Once this soul unites with a body, we then have a human person. It doesn't matter, they say, whether this person is presently *acting* rationally. What is important is that the rational *capacity* is present. But if we think about it, we run into similar problems as mentioned earlier. If there are no vegetative, sensitive, or rational *directions* injected until about 3 months - how did a specifically *human* biochemical, tissue, organ system get built *before* 3 months?

Or perhaps we should restrict ourselves to a purely *material* definition of a "human person". The human person is simply a complex system of molecules, tissues and organs. But this definition has continuously failed in explaining our experience of thoughts, ideas, and concepts, and especially of intentionally, willing, or choosing. It is argued that a "person" is simply a more advanced sophisticated *phase* of a material complex human being. But aren't we really talking then about a secondary or accidental quality? Surely the definition of the nature of a human person should not be put in terms of only a secondary or accidental *phase* - however sophisticated it may be. And again, if you are arguing from the materialist premise that a "human person" is defined *only* in terms of sentience, or the physical integration or functioning of the brain, then you will also have to argue for infanticide, because as pointed out, full integration and sentience is also not completed until several years *after* birth.

### V. Questions about professional "expertise"

Perhaps this is an appropriate point to at least raise the ticklish and often buried question of both scientific and philosophical "expertise." It is clear even from the few arguments presented here (much less from the arguments which many have addressed in other places[85]) that there are serious problems with both the scientific and philosophical mis-information pervading these arguments on "personhood."

The science used is often cryptic and/or simply incorrect, and does not apply to or is irrelevant to the philosophical issue it is trying to ground. Some still *insist* that the "science" being used is correct - although certainly to so "insist" does not make it so. We would all welcome those who support such "scientific" claims to *prove* them. When all of the embryological, human genetic and other scientific texts - as well as the most recent research and assurances by the most respected researchers - state clearly and unequivocally that very different *basic* scientific facts are universally acknowledged which actually *contradict* the scientific "facts" used by many of the proponents of delayed personhood, let those proponents defend their scientific "facts" openly and publicly before a body of their scientific peers.

What embryologist, for example, would agree that eggs and sperms are really the same as zygotes; that cells divide neatly into two, four, 8, etc.; that

"totipotency" is somehow problematic, vague, or "indecisive"; that none of the cells from the trophoblast layer ever find their way into the fetus or even the adult human being; that twinning never takes place after 14-days; or that the brain is parallel to the nervous system, or that either is fully integrated by the eighth week? What chemist would agree that the sharing of *electrons* when Na and Cl combine changes the very *natures* of these elements, or that the nucleus of a radioisotope is physically analogous to the nucleus of a living plant or animal cell? Why don't other scientists publicly or privately refute such scientific mis-information? Might they lose much-needed research grants if they did? At what point does such scientific mis-information become unethical?

The philosophy that is often invoked is just as problematic. Sometimes the "philosopher" apparently has had no background in the history of philosophy, and seems to be totally *oblivious* to the theoretical problems inherent in any philosophical position with a mind/body split. Nor does there seem to be the least awareness that these philosophies are not really viable — but interesting today mostly from an historical or propedeutic perspective. Sometimes an historical philosopher is depicted with gross imprecision, or out of context — making that historical philosopher "say" things he never would or could conclude to.

There is no way many "quotes" from Aristotle, Aquinas or Descartes can be sustained. And it is hardly a new academic insight that the Aristotle of the *De Anima* is and has been (for centuries) highly problematic and contradictory to his main-stream metaphysical doctrines on substance.[86] Nor did Aristotle or Thomas even mention "proto-matter", and both argued against such a concept. Neither would have defined "substance" as "mass-energy"; nor equated "quantity" with "mass." And Thomas would have always included *esse* in his definition of any "substance." Descartes' philosophy was abandoned hundreds of years ago because of its multitudinous theoretical problems — not only because of its mind/body split, but also because of the blatantly erroneous and absurd *scientific* theories to which it led.[88] Again, let the "philosophers" in these "personhood" debates defend their philosophical positions with their mind/body splits, as well as their historical philosophical "depictions" and interpretations, openly and publicly before a body of philosophical *scholars.* Or would that be considered too "uncollegial"? At what point does "collegiality" become unethical?

This observation has serious implications for the assumed "professional" status of researchers, philosophers, ethicists and bioethicists — issues which have received too little attention. Scientific, philosophical, ethical or bioethical "experts" are being used more and more as "expert witnesses" — for example, in the media, courtrooms, Congressional hearings, and federal panels. They help to determine to a great extent critical decisions and public policy. It would seem that they should at least be held to the same standards of professional activity as are other "professionals" who have as significant an impact on the public welfare. Interestingly, these four "professions" are *not even listed* in the *Codes of Professional Responsibility*[89] — although physicians are. I do not consider myself an "expert" in any of these fields at all, and surely I am fallible as well. But

certainly there must be *some* bare minimum of standards in these fields below which one can not go without expecting to be held accountable.

As "food for thought", consider the above-mentioned *Codes*. Among the criteria used as standards for "professionals" in that work are: accountability and responsibility; competence and qualifications; education, training and experience; law and legal requirements; licensing, certification, and accreditation; and other codes, bylaws, policies and technical standards — to name but a few. A glance down the list of "professions" included under these standards of behavior reveals some interesting examples:

**1. Accountability and responsibility** (p. 479): these professions state specific "codes of professional conduct" or "codes of ethics": accountants, arbitrators, architects, bankers, business executives, clinical social workers, counselors, dental hygienists, dentists, engineers, financial planners, government lawyers, hospitals, insurance agents, journalists, lawyers, legal assistants, lobbyists, mediators, neutrals, nurses, personnel consultants, physicians, prosecutors, psychiatrists, psychologists, public administrators, real estate agents, social workers, and trial lawyers. Note that researchers, philosophers, ethicists and bioethicists have no formal professional code of ethics, and no formal professional standards of behavior.

**2. Competence and qualifications** (pp. 485-486): these professions state specific requirements which must be met before practising, including the mastery of a defined body of knowledge and the attainment of professional degrees which reflect similar requirements; many require testing on local, state or national levels: accountants, advertising agencies, arbitrators, bankers, business executives, clinical social workers, counselors, dental hygienists, dentists, direct marketers, engineers, financial planners, hospitals, insurance agents, journalists, law librarians, lawyers, legal assistants, mediators, neutrals, nurses, physicians, prosecutors, psychiatrists, psychologists, public administrators, real estate agents, social workers and trial lawyers. On the other hand, biological researchers are allowed to use radioisotopes without having a course in nuclear chemistry, or chemists are allowed to use infectious microbes without having a course in microbiology or sterile technique. Also, one finds metaphysicians teaching bioethics with no previous coursework, ethicists teaching metaphysics with no previous coursework, and bioethicists teaching metaphysics and ethics with no previous coursework. Wouldn't it be odd to find a lawyer teaching organic chemistry with no previous coursework in organic chemistry? As someone once aptly put it, "you can't teach what you don't know!" And although philosophers, ethicists, and bioethicists must meet the idiosyncratic requirements of their degree institutions, there are no local, state or national testing requirements or standards to meet in order to assure the public of any common degree of competence or mastery of a similarly defined body of knowledge.

**3. Education, training and experience** (p. 492): these professions go beyond the above standards by requiring constant professional up-dating of information under formal, systematic conditions, as well as competence in specific training and a clear demonstration of effective experience: accountants, advertising agencies, arbitrators, architects, bankers, business executives, clinical social

workers, counselors, dental hygienists, dentists, engineers, financial planners, hospitals, insurance agents, journalists, law librarians, lawyers, legal assistants, lobbyists, mediators, neutrals, nurse, personnel consultants, physicians, prosecutors, psychiatrists, psychologists, public administrators, real estate agents, social workers, and trial lawyers. Note that researchers are not required to take courses in research ethics; nor do physicians or nurses necessarily know how to do basic or clinical research. Nor do philosophers, ethicists, or bioethicists have uniform requirements for course work, *yet alone even agree on how to define the subject-matters of their disciplines!* There are no requirements for updating their bodies of knowledge, there are variable degrees and levels of post-degree training — if any — and there are no determinable formal and global professional oversights or requirements for any experience.

**4. Law and legal requirements** (pp. 500-501): these professions go even further and require their members to practise their professions within certain local, state and federal legal requirements: accountants, advertising agencies, arbitrators, architects, bankers, business executives, clinical social workers, counselors, dental hygienists, dentists, direct marketers, engineers, financial planners, government lawyers, hospitals, insurance agents, journalists, law librarians, lawyers, legal assistants, lobbyists, mediators, nurses, personnel consultants, physicians, prosecutors, psychiatrists, psychologists, public administrators, real estate agents, social workers, and trial lawyers. There are virtually no local, state or federal legal requirements restricting the practise of philosophers, ethicists or bioethicists.

**5. Licensing, certification and accreditation** (pp. 501-502): these professions require that their members obtain local, state or federal licensing, certification and/or accreditation before they are even allowed to practise: architects, clinical social workers, counselors, dental hygienists, dentists, engineers, financial planners, hospitals, insurance agents, lawyers, legal assistants, mediators, nurses, personnel consultants, physicians, prosecutors, psychiatrists, psychologists, real estate agents, and trial lawyers. Although physicians and nurses are required to be licensed as care givers, they are not required to be licensed as clinical researchers; nor are bench scientists required to be licensed to do basic research. Clearly philosophers, ethicists and bioethicists are not required to be licensed or certified to practise on any local, state or federal level.

In these times of specialization, many "insist" that we must rely on the "professional expertise" of others. But if this and other studies on the arguments for "personhood" indicate any thing, it is that one still must question the "expertise" that seems to abound today. If one prefers to propound a scientific/philosophical/ethical/bioethical theory that the world is made up of "quadrads" or "zeta particles," for example, and that a human being is defined in such terms, such a theory used to be entertained "indulgently." But today, when such theories are taught *as fact* to thousands of students, and further incorporated into local, state, national and international public policies and guidelines which affect the health, welfare and very lives of multi-millions of innocent human beings, then such theories, as well as those who espouse and promote them, ought to bear serious accountability to the public who eventually *bears the brunt* of

such theoretical mis-information.

## VI. Conclusion

Given the scientific and philosophical problems inherent in the positions which argue for the various biological marker events of "personhood," can we really accept their various conclusions? Can we accept either the "science" that is used or the rationalistic or empiricist philosophical definitions of human beings or human persons which are incorporated into those arguments? Or is it even *possible* to reconcile the correct biological facts with a philosophical definition of a human being or a human person?

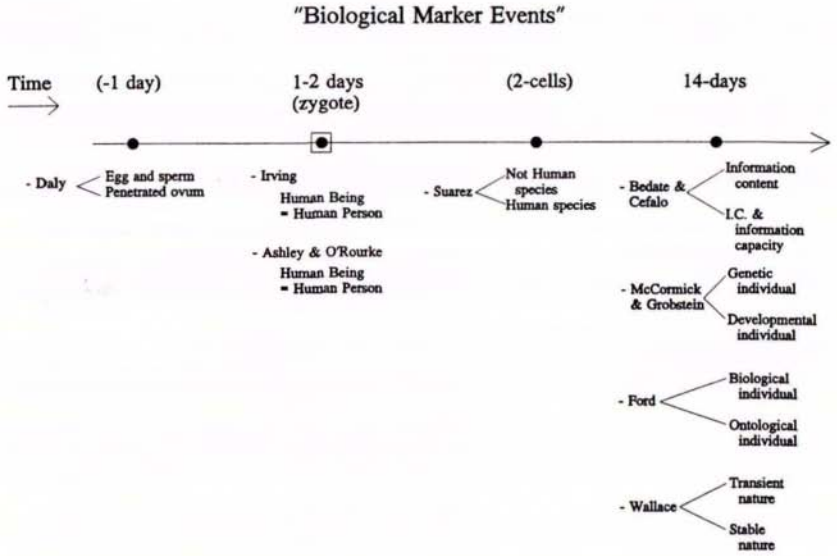
What I am leading to is a definition which does not *split* the human being from the human person, and which does not consist of only a part of the human beings of which we have experience. Can you really have a human person without simultaneously having a human being? And vice-versa, can you really have a human being without also simultaneously having a human person?

I would argue no — you *really* can't split them (except *conceptually),* as rationalistic or empiricist philosophers are wont to do. But if you do define a human person as only a *part* of the *whole* complex — i.e., *only* in terms of matter, or sentience, or soul, or a part of the soul — then you will also have to argue not only for delayed hominization, but for the infanticide of even normal healthy infants, as well. *And delayed hominization simply does not match up with the correct empirical facts.* Philosophically what has occured is that a "part" of a whole has been turned into a *whole thing itself* (e.g., the "soul" alone, or the "body" alone are considered separate independent substances in themselves). And, of course, this leads to the chronic Platonic or Cartesean problems of a mind/soul, soul/body, or even a body/body split — with all of the accompanying *chorismos* or separation problems latent in those philosophical positions.

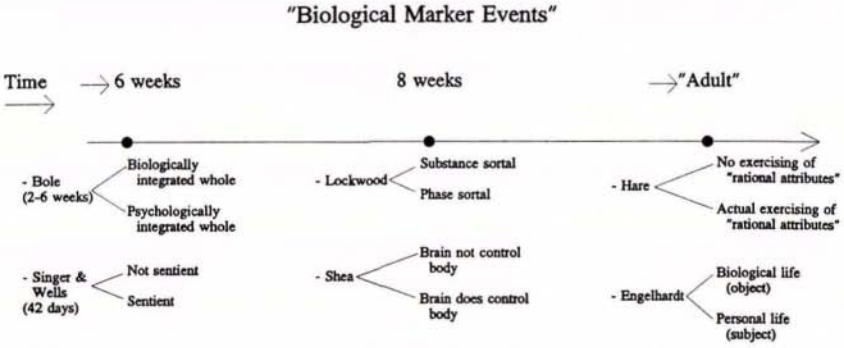
However, if we look closely at the earlier Aristotelean-Thomistic ball-park definition of a human person I would submit that — oddly enough — it *matches* the most contemporary body of scientific facts that are available today. For example, at syngamy *substantial* change has taken place, resulting in a *human* zygote possessing 46 chromosomes, and a human *nature* or potency which contains *all* of the information needed to effect or cause *specifically human* accidental or embryological change or development. And this original information is not lost until the death of the adult human being. Biological phenomena, such as totipotency, "positional molecules" and even twinning are really *normal* phenomena which are supposed to happen, and are *explained* by the human genetic information in the original single-cell human zygote. Once the biological facts are correctly understood it is not difficult to define a human being. From empirical observations we *can* draw our philosophical concepts of personhood, and these concepts should surely reflect as accurately as possible those biological facts — or else we are not philosophizing about the real world at all.

I have attempted to demonstrate, however briefly, that to define a "human

being" or a "human person" in terms of only a *part* of the whole leads to counterintuitive incomplete expressions of what we can experience about human persons, as well as a *mismatch* with the correct empirical facts. The definition of a "human being" or a "human person" does not have to be relative — as long as the *correct* science is employed, and our philosophical definitions actually *match* that reality. I leave it up to you to decide which of the proffered definitions make that match.




(Figure 1)

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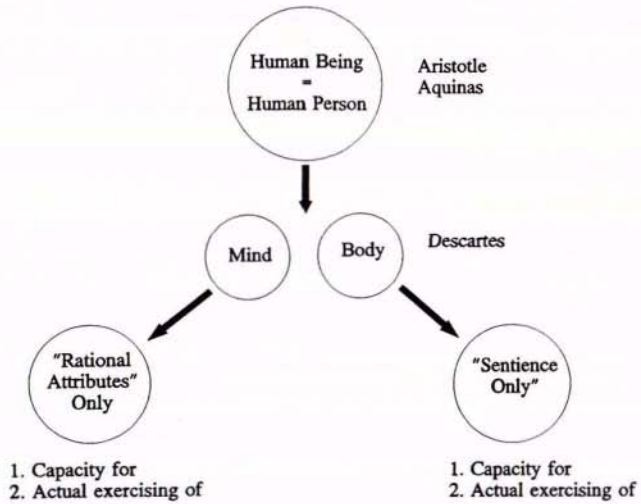


(Figure 3)

## References

1. See Etienne Gilson, *Being and Some Philosophers* (Toronto: Pontifical Institute of Mediaeval Studies, 1949); also, Frederick Copleston, *A History of Philosophy* (New York: Image Books, 1962).

2. See Dianne Nutwell Irving, *Philosophical and Scientific Analysis of the Nature of the Early Human Embryo* (Doctoral dissertation: Washington, D.C., Department of Philosophy, Georgetown University, April 1991), pp. 267-273 (includes charts of 26 of the arguments).

3. Fr. Tom Daly, "When does a human life begin? The search for a marker event", in Karen Dawson and Jill Hudson (eds.), *Proceedings of the Conference: IVF: The Current Debate* (Clayton, Victoria, Australia: Monash Center for Human Bioethics, 1987), 79.

4. Irving, *Philosophical and Scientific Analysis of the Nature of the Early Human Embryo* (1991), particularly Chap. 5.; Benedict Ashley and Kevin O'Rourke, *Health Care Ethics: A Theological Analysis* (St. Louis: Catholic Health Association, 1989, 3rd ed.); also Benedict Ashley, "A critique of the theory of delayed hominization," in D. G. McCarthy and A. S. Moracqewski, (eds.), *An Ethical Evaluation of Fetal Experimentation: An Interdisciplinary Study* (St. Louis: Pope John XXIII Medical-Moral Research and Education Center, 1976), 113-133; R. Werner, "Abortion: the moral status of the unknown", in *Social Theory and Practice,* 3 (1974): 202; R. Wertheimer, "Understanding the abortion argument", *Philosophy and Public Affairs,* 1 (1971):

67-95; B. Brody, "On the humanity of the fetus;, in Tom Beauchamp and LeRoy Walters, (eds.), *Contemporary Issues in Bioethics* (California: Wadsworth, 1978), 229-240; J. Santamaria, *"In vitro* fertilization and embryo transfer", in M. N. Brumsky, (ed.), *Proceedings of the Conference: In Vitro Fertilization: Problems and Possibilities* (Clayton, Victoria: Monash Center for Human Bioethics, Clayton, Vic., 1982), 48-53; G. T. Noonan, "An almost absolute value in history", in J. T. Noonan (ed.), *The Morality of Abortion* (Cambridge, MA: Harvard University Press, 1970), 1-59; G.C. Grisez, *Abortion: The Myths, the Realities and the Arguments* (New York: Corpus Books, 1970); T. Iglesias, *"In vitro* fertilization: the major issues", *Journal of Medical Ethics* 10 (1984): 32-37; W. Quinn, "Abortion: identity and loss", *Philosophy and Public Affairs* 13 (1984): 24-54.

Several documents also argue for personhood at "fertilization": Congregation for the Doctrine of the Faith, "Instruction on Respect for Human Life in its Origin and on the Dignity of Procreation," reprinted in *L'Osservatore Romano* (Vatican City: 16 March 1987), 3; Commonwealth of Australia, *Senate Select Committee on the Human Embryo Experimentation Bill 1985,* (Official Hansard Report), Canberra: Commonwealth Government Printer, 1986, 25; Parliamentary Assembly of the Council of Europe, *"On the use of human embryos and foetuses for diagnostic, therapeutic, scientific, industrial and commercial purposes", Recommendation 1046 (1986),* 1; and *Davis v Davis,* 641 1 (D. Tenn. 1989).

For arguments counter fertilization, see Stephen Buckle, Karen Dawson and Peter Singer, "The syngamy debate: when precisely does a human life begin?", in Peter Singer, *et al* (eds.), *Embryo Experimentation* (New York: Cambridge University Press, 1990), 214-215; Karen Dawson, "Fertilization and moral status: A scientific perspective", in P. Singer, *Embryo Experimentation,* 1990, 43-52; J. Donceel, "Immediate animation and delayed hominization", *Theological Studies* 31 (1970), p. 75-105; Michael J. Coughlan, "From the moment of conception...': The Vatican instruction on artificial procreation techniques", *Bioethics* 2(4), 1988, p. 294-316; also, Dame Mary Warnock, *Report of the Committee of Inquiry into Human Fertilization and Embryology* (London: Her Majesty's Stationary Office, 1984); (also, all of the writers *infra* who argue for a biological marker event of personhood any time after fertilization).

5. Antoine Suarez, "Hydatidiform moles and teratomas confirm the human identity of the preimplantation embryo", *Journal of Medicine and Philosophy,* 15 (1990): 627-635.

6. Carlos Bedate and Robert Cefalo, "The zygote: to be or not be a person", *Journal of Medicine and Philosophy* 14 (6), 1989: 641; Richard McCormick, S.J., "Who or what is the preembryo?", paper presented at the Andre E. Hellegers Lecture (Washington, D.C., Georgetown University: May 17, 1990) (pre-publication manuscript); see also Richard McCormick, S.J., "Who or what is the preembryo?", *Kennedy Institute of Ethics Journal* 1(1), 1991, 1; Norman Ford, "The case against destructive embryo research", in *Proceedings of the Conference: IVF: The Current Debate,* 90-95; also Ford, *When Did I Begin?* (New York: Cambridge University Press, 1988); sometimes William Wallace, "Nature and human nature as the norm in medical ethics", in Edmund D. Pellegrino, John Langan and John Collins Harvey, (eds.), *Catholic Perspectives on Medical Morals* (Dordrecht: Kluwer Academic Publishing, 1989), 23-53.

7. D. N. Irving, *Philosophical and Scientific Analysis of the Nature of the Early Human Embryo* (1991); *supra,* pp. 267-273.

8. Thomas J. Bole, III, "Metaphysical accounts of the zygote as a person and the veto power of facts", *Journal of Medicine and Philosophy* 14 (1989): 647-653; also, "Zygotes, souls, substances, and persons", *Journal of Medicine and Philosophy* 15 (1990): 637-652.

9. Singer and Wells, in D. Gareth Jones, "Brain birth and personal identity", *Journal of Medical Ethics* 15 (1989): 175.

10. Michael Lockwood, "When does life begin?", in Michael Lockwood, (ed.), *Moral Dilemmas in Modern Medicine* (New York: Oxford University Press, 1985), 10; also Lockwood, "Warnock versus Powell (and Harradine): When does potentiality count?", *Bioethics* 2 (3), 1988: 187-213.

11. M. C. Shea, "Embryonic life and human life", *Journal of Medical Ethics* 11 (1985): 205-209.

12. R. M. Hare, "When does potentiality count? A comment on Lockwood", *Bioethics* 2 (3), July 1988: 214.

13. H. T. Englehardt, *The Foundations of Bioethics* (New York: Oxford University Press, 1985), 111.

14. Peter Singer, "Technology and procreation: How far should we go?", *Technology Review* (Feb./Mar. 1985).

15. See Dianne N. Irving, "Science, philosophy, theology — and altruism: the *chrosimos* and the *zygon*", in Hans May, Meinfried Striegnitz, Philip Hefner (eds.), *Loccumer Protokolle* (Rehburg-Loccum: Evangelische Akademie Loccum, 1992), forthcoming; Etienne Gilson, *Being and Some Philosophers* (Toronto: Pontifical Institute of Mediaeval Studies, 1949); Frederick Copleston, *A History of Philosophy* (New York: Image Books, 1962; Leonard J. Eslick, "The material substrate in Plato", in Ernan McMullin, ed. *The Concept of Matter in Greek and Medieval Philosophy* (Indiana: University of Notre Dame Press, 1963); Frederick Wilhelmsen, *Man's Knowledge of Reality* (New Jersey: Prentice-Hall, Inc., 1956), esp. Chaps. 2 and 3.

16. For an excellent explanation of the differences between Boethius' and Aquinas' definitions of a "human being" or "human person", see Kevin Doran, "Person — a key concept for ethics", *Linacre Quarterly* 56 (4), 1989, 39.

17. See J. Cottingham, R. Stoothoff, D. Murdoch (trans.), *The Philosophical Writings of Descartes* (Cambridge: Cambridge University Press, 1989).

18. Aristotle, in his *De Coelo* (1.5.271b, 9-10), in Richard McKeon (ed.), *The Basic Works of Aristotle* (New York: Random House, 1941).

19. See Irving, *Philosophical and Scientific Analysis...*(1991); esp. pp. 83-125, and Chap. 5.

20. Aristotle, *Categories,* in Sir David Ross, *Aristotle* (New York: Random house, 1985), p. 20-21; also, Aristotle, *Analytica Posteriora* 2.19, 100a 3-9, in Richard McKeon (ed.), *The Basic Works of Aristotle* (New York: Random House, 1941); for Aquinas' similar position, see: *The Division and Method of the Sciences,* Q6, a.1, reply to 1st Q, pp. 65-66; ibid., Q6, reply to 3rd Q, pp. 71-72; ibid., Q6, a.2, pp. 176-178; ibid., Q6, a.4, p. 90; ibid., Q5, a.3, p.35 (also quoted there in note 21: *In I Post. Anal.* lect. 1-3, and in *De Veritate* 1.1); see also George Klubertanz, *Introduction to the Philosophy of Being* (New York: Appleton-Century-Crofts, 1963), pp. 293-298.

21. Benjamin Lewin (ed.), *Genes III* (New York: John Wiley and Sons, 1987), pp. 11-13, 17-19, 30, 32, 33, 35, 37, 79, 91, 93-94; also Alan E. H. Emery, *Elements of Medical Genetics* (New York: Churchill Livingstone, 1983), pp. 25, 34, 65, 101-103.

22. Aristotle, *Categories* 5. 2a, 11-13, (McKeon, 1941), p. 9; also (Ross, 1985), p. 24; also (McKeon, 1941): *Metaphysica* 7.11.1036b, 3-7, p. 800; 8.1.1042a, 30-31, p. 812; even in his *De Anima* (McKeon, 1941) Aristotle argues for the composite: 2.1.412b, 6-10, p. 555 and 2.1.413a, 3-4, p. 556; for Thomas Aquinas, see his *Summa Theologica,* Fathers of the English Dominican Province (trans.) (Westminster, Md.: Christian Classics, 1981, Vol. 1): Ia.q29,a.1, ans., ad2,3,5, p. 156; ibid., a.2, ans., p. 157; see also Kevin Doran, "Person — a key concept for ethics", *Linacre Quarterly* 56(4), 1989, p. 39.

23. Aristotle, *De Anima* (McKeon, 1941): 1.4.408b, 13-15, p. 548; also, 1.4.488b, 25-26, p. 548; for Aquinas see ST Ia.q75, a.2, ad.2, p. 365; also see Frederick Wilhelmsen, *Man's Knowledge of Reality* (New Jersey: Prentice-Hall, Inc., 1956), pp. 78-79 and 103-105.

24. Keith L. Moore, *The Developing Human* (Philadelphia: W. B. Saunders Company, 1982, 3rd. ed.), pp. 14ff; also Benjamin Lewin, *Genes III* (New York: John Wiley and Sons, 1987), pp. 24ff.

25. Aristotle, *Physica,* (McKeon, 1941): 1.7.191a, 15-18, pp. 232-233; also 2.3.194b, 23-35, pp. 240-241; see also, Henry B. Veatch, *Aristotle: A Contemporary Approach* (Indiana: Indiana University Press, 1974), Chaps. 2,3; for Aquinas, see George Klubertanz, *The Philosophy of Human Nature* (New York: Appleton-Century-Crofts, 1963), pp. 124ff; also Klubertanz *(Philosophy of Being,* 1963), pp. 98-100, 116 (and Thomas Aquinas, *Commentary on Aristotle's Metaphysics,* Bk. VIII, lect. 1, (ed.) Cathala, Nos. 1688-1689, as quoted p. 118).

26. Ibid.

27. See Moore (1982) and Lewin (1987), note 26 *supra.*

28. Irving, *Philosophical and Scientific Analysis...*(1991), see notes pp. 78-80. There is a rapidly increasing volume of this kind of work, e.g., Kollias, G; Hurst, J; deBoer, E. and Grosveld, F. "The human beta-globulin gene contains a downstream developmental specific enhancer", *Nucleic Acids Research* 15(14) (July, 1987), 5739-47; R. K. Humphries et al, "Transfer of human and

murine globin-gene sequences into transgenic mice", *American Journal of Human Genetics* 37(2) (1985), 295-310; A. Schnieke et al, "Introduction of the human pro alpha 1 (I) collagen gene into pro alpha 1 (I) — deficient Mov-13 mouse cells leads to formation of functional mouse-human hybrid type I collagen", *Proceedings of the National Academy of Science — USA* 84(3) (Feb. 1987), pp. 764-8.

29. See note 27 *supra.*

30. *pace* R.M. Hare, "When does potentiality count? A comment on Lockwood", *Bioethics* 2(3), 1988.

31. *pace* Michael Lockwood, "Warnock versus Powell (and Harradine): When does potentiality count?", *Bioethics* 2(3), 1988.

32. For brevity I will designate Aristotle's theory of substance as a *composite,* which is the pre-dominant one in his *Categories, Physics,* the first half of the *Metaphysics,* and even in many parts of his *De Anima,* as "Aristotle - proper". Aristotle's theory of substance as *form alone* — or as only the *"rational."* part of the form, and the succession of souls as found predominantly in the second half of his *Metaphysics* and in parts of *the De Anima,* contradicts the former theory. There is also some degree of contradiction in Thomas — insofar as he sometimes "unblushingly" follows Aristotle's theory of separate form (see, for example, the differences between the definition of a human being and that of a human soul in the *De Ente et Essentia* in Chapter Two and Chapter Four.

33. Aristotle, *Physica* 2.1.193b, 3-5, (McKeon, 1941), p. 238.

34. Ibid., 2.2.194b, 12-14, p. 240; see also 2.2.193b, 33-37, p. 239.

35. Aristotle, *De Anima* 1.5.411b, 14-18, (McKeon, 1941), p. 554.

36. Aristotle, *De Anima,* 1.5.411b, 24-28, (McKeon, 1941), p. 554.

37. Aristotle, *Metaphysica,* 3.2.997b18-998a10, (McKeon, 1941), p. 721; see also 11.1.1059a34-1059b14. pp. 850-851; for Aquinas, see ST, Ia.q.45, a.4, ad.2, p. 235.

38. Thomas Aquinas, ST, Ia.q29, a.1, ans., ad.2,3,5, p. 156; ibid, a.2, ans., p. 157; also ST, IIIa.q19, a.1, ad.4.2127; see also, Kevin Doran, "Person-a key concept for ethics", *Linacre Quarterly* 56(4), 1989, p. 39.

39. See note 24 *supra;* also Thomas Aquinas, *On being and Essence,* Armand Maurer (trans.), (Tornoto: Pontifical Institute of Mediaeval Studies, 1983), Chap. 2; also *The Division and Method of the Sciences,* Armand Mauer (trans.), (Toronto: Pontifical Institute of Mediaeval Studies, 1986), p. 14, 29, 39, 40.

40. Thomas Aquinas, ST, IIIa, q19, a.1, ad.4.2127; see also Kevin Doran (1989), p. 39.

41. Thomas Aquinas, ST, Ia.q75, a.4, ans., p. 366.

42. For example, Suarez, McCormick, Ford, Wallace and Bole, *infra.*

43. Aristotle, *De Anima,* 1.5.411b, 14-18, (McKeon, 1941), p. 554; also, 1.5.411b, 24-28, p. 554; for Aquinas, see notes 41 and 39,, *supra.*

44. As Klubertanz has expressed it, the human soul, being a form, cannot be divided. The ovum and sperm unite, "thus giving rise to a single cell with the *material disposition required* for the presence of a soul": Klubertanz, *The Philosophy of Nature,* 1953, p. 312.

45. Carlos Bedate and Robert Cefalo, "The zygote: to be or not be a person", *Journal of Medicine and Philosophy* 14(6), 1989, p. 641-645.

46. Thomas J. Bole, III, "Metaphysical accounts of the zygote as a person and the veto power of facts", *Journal of Medicine and Philosophy* 14, 1989: 647-653; also, "Zygotes, souls, substances, and persons", *Journal of Medicine and Philosophy* 15, 1990: 637-652.

47. Benjamin Lewin (ed.), *Genes III* (New York: John Wiley and Sons, 1983), p. 681; also Alan E. H. Emery, *Elements of Medical Genetics* (New York: Churchill Livingstone, 1983), p. 93.

48. In addition to the references on "information cascading", see also those in note 30, *supra.*

49. Antoine Suarez, "Hydatidiform moles and teratomas confirm the human identity of the preimplantation embryo", *Journal of Medicine and Philosophy* 15, 1990, 630.

50. Jerome Lejeune (Nobel Prize, genetics), testimony in *Davis v. Davis,* Circuit Court for Blount County, State of Tennessee at Maryville, Tennessee, 1989; as reprinted in Martin Palmer, *A Symphony of the Pre-Born Child: Part Two* (Hagerstown, MD: NAAPC, 1989), 9-10.

51. See, e.g., Richard McCormick, S.J., "Who or what is the preembryo?", paper presented at the Andre E. Hellegers Lecture (Washington, D.C. Georgetown University: May 17, 1990);

(pre-publication manuscript); see also, McCormick, "Who or what is the Preembryo?", *Kennedy Institute of Ethics Journal* 1(1), 1991, p. 3; also see reference in Lejeune, note 50 *supra,* p. 14.

52. Lejeune, 1989, p. 14.

53. For example, Grobstein and McCormick, Ford, Wallace *infra.*

54. Lejeune, 1989, p. 17, 20; also see article by Mavilio, where he explains that the modulation of the methylation pattern represents a key mechanism for regulating the expression of human globin genes during embryonic, fetal and adult development in humans. Mavilio et al, "Molecular mechanisms of human hemoglobin switching: selective undermethylation and expression of globin genes in embryonic, fetal and adult erythroblasts',, *Proceedings of the National Academy of Sciences USA,* 80(22) (1983): p. 690;7-11; see also Alan E. H. Emery, *Elements of Medical Genetics* (New York: Churchill Livingstone, 1983), p. 103.

55. See references on "cascading" in note 48, *supra;* also "transgenic mice" in note 30, *supra.*

56. Antoine Suarez, "Hydatidiform moles and teratomas confirm the human identity of the preimplantation embryo", *Journal of Medicine and Philosophy* 15 (1990): p. 631.

57. Richard A. McCormick, S.J., "Who or what is the preembryo?", *Kennedy Institute of Ethics Journal* 1(1), 1991: p. 2.

58. Ibid., p. 3.

59. Ibid., p. 3.

60. Keith L. Moore, *The Developing Human* (Philadelphia: W. B. Sunders Co., 1982), p. 33, 62-63, 68, 111, 127; also see K. Chada et al, "An embryonic pattern of expression of a human fetal globin gene in transgenic mice", *Nature* 319 (6055), 1986: 685-9; also G. Migliaccio et al, "Human embryonic hemopoiesis. Kinetics of progenitors and precursor underlying the yolk sac — liver transition;, *Journal of Clinical Investigation* 78(1), 1986: 51-60.

61. McCormick (1991), p. 4.

62. Karen Dawson, "Segmentation and moral status", in Peter Singer *et al, Embryo Experimentation* (New York: Cambridge University Press, 1990), p. 58; see also Keith Moore (1982), p. 133.

63. Norman Ford, *When Did I Begin?* (New York: Cambridge University Press, 1988), p. 298.

64. Ibid., p. 156.

65. Keith L. Moore, *The Developing Human* (1982), p. 1.

66. William A. Wallace, "Nature and human nature as the norm in medical ethics:, in Edmund D. Pellegrino, John P. Langan and John Collins Harvey (eds.), *Catholic Perspectives on Medical Morals* (Dordrecht: Kluwer Academic Publishing, 1989), 23-53.

67. Ibid., p. 30.

68. Aristotle, *Metaphysica* VI, 1029 a.20, Ross (trans.), in Klubertanz, *Philosophy of Being* (1963), p. 115 (note 27); for Aquinas see ST, IA.q6, a.1., ad.3, p. 330; also *Commentary on Aristotle's Metaphysics,* Book VIII, lect. 1 (ed. Cathala, No. 1686), in Klubertanz (1963), p. 100, and 124-125.

69. Klubertanz (1963), p. 100.

70. Thomas Aquinas, ST, Ia.q.45, a.4, ad. 1 and 2, p. 235; also, Ia.q6, a.1., ad. 3, p. 330; also Ia q.65, a.3, ans., p. 327; also ibid, a.4, sed contra, p. 327; also ibid, ans., p. 328-329; also, Ia.q.76, a. 7, ans., 381.

71. Aristotle, *Categories,* in Ross (1985), p. 20-21; Thomas Aquinas, *The Division and Method of the Sciences* (Mauer, ed., 1986), pp. 37-38.

72. Wallace (1989), p. 43-44.

73. Ibid., p. 33.

74. D. Gareth Jones, "Brain birth and personal identity", *Journal of Medical Ethics* 15(4), 1989, 178. Oddly enough Jones will himself argue for personhood at 6-7 months (p. 177).

75. Howard W. Jones and Charlotte Schroder, "The process of human fertilization: implications for moral status", *Fertility and Sterility* 48(2), Aug. 1987: p. 192.

76. G. Gareth Jones (1989), p. 177.

77. For example, see Singer and Englehardt, *infra.*

78. Rene Descartes, *Meditations on First Philosophy,* in John Cottingham, Robert Stoothoff and Dugald Murdoch (trans.), *The Philosophical Writings of Descartes* (New York: Press Syndicate of the University of Cambridge, 1984), 2nd Meditation, 12ff.

79. John Locke, *An Essay Concerning Human Understanding,* A. D. Woozley (ed.) (London: Fontana/Collins, 1964), Book Two, Ch. XXXI, pp. 211-212.

80. H. T. Englehardt, *The Foundations of Bioethics* (New York: Oxford University Press, 1985), p. 111.

81. Michael Tooley, "Abortion and infanticide", in Marshall Cohen et al (ed.), *The Rights and Wrongs of Abortions,* (New Jersey: Princeton University Press, 1974), pp. 59, 64.

82. Helga Kuhse and Peter Singer, "For sometimes letting — and helping — die", *Law Medicine and Health Care* 3(4), 1986: pp. 149-153; also Kuhse and Singer, *Should the Baby Live? The Problem of Handicapped Infants* (Oxford: Oxford University Press, 1985), p. 138; also, Peter Singer and Helga Kuhse, "The ethics of embryo research", *Law, Medicine and Health Care* 14 (13-14), 1987. For one reaction, see Gavin J. Fairbairn, "Kuhse, Singer and slippery slopes", *Journal of Medical Ethics* 14 (1988), p. 134.

83. Peter Singer, "Taking life: abortion", in *Practical Ethics* (London: Cambridge University Press, 1981), p. 118; also, see note 84 *supra.*

84. Peter Singer, "Taking life: abortion" (1981), p. 118.

85. D. N. Irving, *Philosophical and Scientific Analysis of the Nature of the Early Human Embryo* (1991); also D. N. Irving, "Science, philosophy, theology and altruism: the *chorismos* and the *zygon"* (1992); for an excellent work on the previous topic by an expert in both science and philosophy, see Anthony Fisher, O.P., "Individuogenesis and a recent book by Fr. Norman Ford" *Anthropotes* 2 (1991), pp. 199ff; also A. A. Howsepian, "Who or what are we?", *Review of Metaphysics* 45 (March 1992): pp. 483-502; also, Robert A. Destro, "Quality-of-life ethics and constitutional jurisprudence: The demise of natural rights and equal protection for the disabled and incompetent", *Journal of Contemporary Health Law and Policy* 2 (Spring, 1986: pp. 71-130; also Edmund D. Pellegrino, "Character and the ethical conduct of research", *Accountability in Research* 2(1), 1992: pp. 1-11; also Pellegrino "Character, virtue and self-interest in the ethics of the professions", *Journal of Contemporary Health Law and Policy* 5 (Spring 1989), pp. 53-73; also, Pellegrino "Trust and Distrust in Professional Ethics", in E. Pellegrino, R. Veatch, J. Langan, *Ethics, Trust, and the Professions* (Washington, D.C.: Georgetown University Press, 1991), pp. 69-85; also, Ashby Sharpe, *How the Liberal Ideal Fails As a Foundation for Medical Ethics; or, Medical Ethics "In a Different Voice"* (Doctoral dissertation, Washington, D.C.: Georgetown University, 1991), Chaps. 1-3; for a scholarly work on distinguishing different "Thomists' " ethical grounding, see George C. Reilly, O.P., "The empiricism of Thomistic ethics", *Proceedings of the American Catholic Philosophical Association* (Washington, D.C.: The Office of the Secretary of the Association, The Catholic University of America, 1956), pp. 1-36; a short 20-article bibliography of critiques of bioethics can be found in Benedict M. Ashley, O.P. and Kevin D. O'Rourke, O.P., *Ethics of Health Care* (St. Louis: The Catholic Health Association, 1986), pp. 250-251.

For works more focused on science, see Adil E. Shamoo, "Role of conflict of interest in scientific objectivity: A case of a Nobel Prize work", *Accountability in Research* 2 (1992): pp. 55-75; also, Shamoo, "Policies and quality assurance in the pharmaceutical industry", *Accountability in Research* 1 (1991): pp. 273-284; also Shamoo, "Role of conflict of interest in public advisory councils", *Ridea Research Foundation Proceedings* (1991); also, Peter McCullagh, *The Foetus as Transplant Donor: Scientific, Social and Ethical Perspectives* (New York: John Wiley and Sons, 1987); also, John C. Bailar III, Marcia Angell, Sharon Boots *et al, Ethics and Policy in Scientific Publication* (Bethesda, MD: Council of Biology Editors, Inc., 1990); also, Gerhard Portele, "Moral development and education", in David Gosling and Bert Musschenga, *Science, Education and Ethical Values* (Geneva: World Council of Churches Publications; and Washington, D.C.: Georgetown University Press, 1985), pp. 31-36; also Gerrit Manenschijn, "Reasoning in Science and Ethics", in Gosling (1985), pp. 37-54; also Crombie, *Medieval and Early Modern Science* (New York: Doubleday Anchor Books, 1959); also, for a feminist view see Evelyn Fox Keller, *Reflections of Gender and Science* (New Haven: Yale University Press, 1985).

86. See Mary Louise Gill, *Aristotle on Substance* (Princeton: Princeton University Press, 1989); also Charlotte Witt, *Substance and Essence in Aristotle* (New York: Cornell University Press, 1989); also Marjorie Grene, *A Portrait of Aristotle* (Chicago: The University of Chicago Press, 1963).

87. Paul Edwards, ed. *The Encyclopedia of Philosophy* (New York: Macmillan Publishing Co., 1967); Vol. 1, pp. 341-352.
88. Rena A. Gorlin (ed.), *Codes of Professional Responsibility* (Washington, D.C.: The Bureau of National Affairs, Inc., 1991).

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